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## Theater Mental Health Encounter Data (TMHED): Overview of Study Design and Methods

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**ABSTRACT** Research has documented higher risks for mental health problems among service members deployed to war zones, yet a research limitation has been that assessment has generally occurred often years after combat exposure. The Operational Stress Control and Readiness program integrated mental health practitioners with 1st Marine Division units serving in Iraq. This team documented mental health visits between January 2006 and January 2007 and developed the Theater Mental Health Encounter Database (TMHED). This report describes the TMHED study design, measures, and cases. Of 1,336 patients (3,180 patient visits), 10% were women, 75% were high school educated, 55% were mid-paygrade enlisted, and 63% were on their first combat deployment. Compared with the overall deployed population, patient percentages included higher percentages of Marines and Navy personnel but lower percentages of Army and Air Force personnel, more junior enlisted but fewer officers, and fewer college graduates. TMHED provides an unprecedented opportunity to study early psychiatric intervention in a combat zone and prospectively examines postdeployment health and career outcomes.

### INTRODUCTION

A growing body of research has documented the higher risk of both mental and physical health problems among individuals deployed to war zones and exposed to combat stress.<sup>1-15</sup> War veterans from all recent eras—including World War II, Korea, Vietnam, the Persian Gulf Conflict, and more recently, Iraq and Afghanistan—have increasingly been treated at veterans' hospitals for post-traumatic stress disorder (PTSD) and other mental disorders.<sup>12</sup> Research has consistently indicated that military personnel exposed to combat and deployment stressors are at increased risk of mental health problems, such as PTSD, serious depression, alcohol and other substance abuse, impaired work and social functioning, and increased use of health care services.<sup>2-15</sup>

Much of the previous research with military personnel on combat-related PTSD and other mental disorders are limited in that the research often has taken place years after war zone deployment and combat exposure. Even in more recent research on military members deployed to Iraq or Afghanistan, self-report survey assessments typically are completed after deployment and once the military member is out of harm's

way.<sup>4,6,7,13</sup> Biases or errors in self-reporting related to combat exposure may have occurred, and symptoms may have changed as the time between stress exposure and postdeployment circumstances increased.

A few recent prospective studies on deployed military members have examined PTSD and other mental disorders taking either predeployment factors into account<sup>14-16</sup> or documenting physical injuries<sup>17</sup> (e.g., from the Combat Trauma Registry Expeditionary Medical Encounter Database) that occurred during deployment.<sup>18</sup> Recent innovative research using in-theater systems of surveillance of combat and operational stress reactions<sup>19</sup> has examined the impact of predeployment behavioral health screening on mental health problems during combat deployment.<sup>20</sup> However, we could find no previous research using in-depth documentation of psychiatric encounters (including patient-reported combat exposures) in the Iraqi combat theater, or how in-theater psychiatric intervention related to postdeployment outcomes.

The lack of robust in-depth information on in-theater mental health encounters, types and amounts of combat exposures, and how they might influence postdeployment mental health represents a gap in our understanding of combat stressors and their impact on mental health. Research to help fill this gap could lead to improvements in early intervention and better physical and mental health outcomes after leaving combat theaters. In addition, studies related to the delivery and impact of in-theater mental health encounters could help improve early interventions and improve treatment of war-related psychological health problems.

The primary aim of this report is to describe the Theater Mental Health Encounter Database (TMHED), which

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documented psychiatric clinical encounters from January 2006 through January 2007 in the Iraqi combat theater. Data were collected as part of a yearlong pilot program that developed and collected in-depth psychiatric records in conjunction with in-theater psychiatric services. This report describes the TMHED study design, data collection approach, types of measures comprising the data sets, and select descriptive characteristics of cases. A secondary aim was to compare the TMHED patients on several key demographic characteristics with the population of U.S. troops deployed in the Iraqi combat theater during the same time frame. This comparison was a first step in identifying potential risk factors for mental health problems in-theater by examining similarities and differences between those seeking or being referred for mental health services in a combat zone with the full deployed population. Although the primary purpose of this report is to document procedures used in this pilot program to establish the TMHED database, subsequent reports will address broader study objectives integrating TMHED data with both pre- and postdeployment personnel/career history and medical information. The TMHED database provides a unique opportunity to study characteristics of in-theater mental health encounters, and findings may have implications for postdeployment health care and job performance.

## METHODS

### *Study Design and Procedures*

The Operational Stress Control and Readiness (OSCAR) program integrated mental health practitioners into Navy and Marine Corps units serving in the Iraqi combat theater. The 1st Marine Division OSCAR team providers developed and implemented a yearlong pilot program to document in-depth information for all psychiatric encounters (including diagnoses and treatments, as well as combat exposures and personal histories) for all cases seen between January 2006 and January 2007. Because the OSCAR providers were deployed with the 1st Marine Division, the populations served during this time frame were stationed primarily in and around Al Anbar province. Thus, the cases that providers treated were primarily Marines, but also included personnel from other U.S. military services and a small number of civilians and foreign nationals (however, civilians and foreign nationals were not included in the TMHED database described here).

The division psychiatrist and his team deployed with the 1st Marine Division (total of 19 providers, including 9 psychiatrists and 10 psychologists) administered mental health services to patients. These providers extensively documented each mental health encounter and administered counseling intervention and treatment to all service members referred for psychiatric intervention while in theater. At each encounter, providers recorded clinical case summary information, including reported combat and psychological trauma exposure, current stress and affective symptoms, mental status, head injuries/symptoms, developmental and social history,

psychiatric and stress diagnoses, treatment plans, and disposition of cases.

Information from clinical case summaries for each encounter was entered into the TMHED database and maintained by the Naval Center for Combat & Operational Stress Control after the yearlong data collection period. After removing all psychiatric clinical notes from records, the data were transported to the Naval Health Research Center (NHRC) for coding and processing into analysis-ready data files.

Given the nature of the data, extra precautions were taken to protect privacy and reduce any risks involving unauthorized disclosure of identifiers, sensitive personal data, or protected health or psychiatric information. Mental health data, such as the types collected in a combat theater, are especially sensitive and require heightened efforts to reduce any risk of inappropriate disclosure that could adversely impact a person's reputation or postservice employability. Thus, efforts at multiple levels were implemented to minimize any risk of inappropriate disclosure, including removal of clinical notes before the transfer of TMHED data records to NHRC, secure transport of data files from Bob Wilson Naval Hospital to NHRC, and storage of data at NHRC on secure network drives and secure source folders using password-protected, access-restricted accounts, and password-protected computers. Results are presented only in aggregate form so individual cases cannot be identified. All procedures used for processing and analyzing TMHED data have been reviewed and approved by the NHRC Institutional Review Board.

### *Subject Cases*

As noted above, psychiatric encounter information was documented for all cases seen by 1st Marine Division psychiatrists, psychologists, and mental health technicians in the Iraqi combat theater between January 2006 and January 2007. However, because the encounter documentation forms and software were revised in July 2006, separate databases (with overlapping but not identical measures) were developed for the first half and the second half of the yearlong data collection period. Because some measures were available only for TMHED patients with visits documented in one or the other versions of the software, descriptive statistics are provided separately for each version to indicate the potential sample size for measures available in the different databases.

Overall, there were 1,336 patients with TMHED-documented psychiatric encounters in theater during the year of data collection. A total of 3,180 patient visits were documented, with 1–16 visits per person. The breakdown across databases (i.e., encounter recorded using different versions of the documentation software) was  $n = 558$  patients (total of 1,345 patient visits) documented only in Database 1 (DB1),  $n = 705$  patients (total of 1,390 patient visits) with encounters documented only in the Database 2 (DB2), and  $n = 73$  patients (total of 445 patient visits) with at least one encounter documented in both databases.



Name (Last, First MI):		Patient I.D. / SSN:	
Current Medications List:		Current Problems List:	
Past Psychiatric History: <input type="checkbox"/> None <input type="checkbox"/> Hospitalization x days <input type="checkbox"/> Outpatient <input type="checkbox"/> Medications <input type="checkbox"/> Therapy / Counseling			
Notes:			
Substance Abuse: <input type="checkbox"/> None		Notes:	
<input type="checkbox"/> EtOH – Amount: Frequency: Duration:		N/A	
<input type="checkbox"/> Drugs – Duration: <input type="checkbox"/> Abuse Type:			
<input type="checkbox"/> Supplements – Amount: <input type="checkbox"/> Abuse Type:			
<input type="checkbox"/> Tobacco – Type: Cigars / Cigarettes / Smokeless Amount: per day / week			
Developmental and Social History			
Family of Origin	Education	Occupational / Military History	Relationships (Support)
<input type="checkbox"/> No Problems	<input type="checkbox"/> < High School <input type="checkbox"/> GED	<input type="checkbox"/> No Problems	<input type="checkbox"/> Single
<input type="checkbox"/> Denies Violence	<input type="checkbox"/> Abuse: <input type="checkbox"/> High School Graduate	<input type="checkbox"/> Fired	<input type="checkbox"/> Married
<input type="checkbox"/> EtOH	<input type="checkbox"/> Sexual <input type="checkbox"/> Some College <input type="checkbox"/> BA/BS degree	<input type="checkbox"/> NJP	<input type="checkbox"/> Divorced
<input type="checkbox"/> Drugs	<input type="checkbox"/> Physical <input type="checkbox"/> Graduate coursework	<input type="checkbox"/> Courts Martial	<input type="checkbox"/> Other:
<input type="checkbox"/> Other abuse:	<input type="checkbox"/> Graduate degree	<input type="checkbox"/> Jail	
Notes:	Notes:	Notes:	Notes:
N/A	N/A	N/A	N/A
Mental Status Exam			
App. Behavior: <input type="checkbox"/> WD WN in NAD, appropriately attired in uniform.		Eye Contact / Speech: <input type="checkbox"/> Good eye contact, normal speech.	
Motor: <input type="checkbox"/> No psychomotor agitation or retardation.		Mood: <input type="checkbox"/> Stated mood was:	
Thought Processes WNL: <input type="checkbox"/> Linear, logical and goal directed.		Affect was	
Cognition: <input type="checkbox"/> A & O x 3 with concentration intact.		Thought Content WNL: <input type="checkbox"/> No SI/HI, intent or plan/No evidence of psychosis	
Intelligence estimated to be:		Memory: <input type="checkbox"/> Intact for immediate, long and short term memory.	
Judgment: <input type="checkbox"/> Intact		Insight: <input type="checkbox"/> Good	
Impulse Control: <input type="checkbox"/> Intact			
Psychiatric Diagnosis		Combat & Operational Stress Diagnosis	
Axis I:		<input type="checkbox"/> Combat Stress: <input type="checkbox"/> Light <input type="checkbox"/> Heavy <input type="checkbox"/> None <input type="checkbox"/> N / A	
Axis II:		<input type="checkbox"/> Traumatic Stress Injury	
Axis III:		<input type="checkbox"/> ASD (Acute Stress Disorder)	
Axis IV:		<input type="checkbox"/> PTSD (Post Traumatic Stress Disorder)	
Axis V: GAF (Current) –		<input type="checkbox"/> Not Applicable	
Axis V: GAF (Past Yr) –			
Formulation:		Notes: N/A	
Treatment Plan			
Goals:		Medications / Interventions <input type="checkbox"/> Informed Consent Given	
1.		1.	
2.		2.	
3.		3.	
Disposition			
Duty Status: <input type="checkbox"/> Light Duty x day(s) <input type="checkbox"/> Return To Duty/Fit for full duty		Safety: <input type="checkbox"/> At low risk for harm to self or others at this time	
Limitations:		<input type="checkbox"/> At high risk for harm to self or others, precautions listed below.	
Notes: N/A			
Provider Signature:		Date/Time:	
Provider Name (Printed or Typed):			

FIGURE 2. Patient-provider visit documentation form: Version 1 (DB1)—Back page.

The mid-year revisions of encounter documentation forms and software were done in response to feedback from mental health staff who noted that some of the data elements in the original version were not designed in a way that best captured patient information provided during psychiatric visits. The bulk of the revisions were made to the Trauma Exposure section, which originally was adapted from a trauma registry documenting “method of injury,” but was then modified to quantify specific combat exposures. For example, in DB1 trauma exposure was documented by check marking whether the service member either witnessed or experienced combat events (e.g., aerial bomb blast, land mine). However, to more fully capture a person’s exposure to potentially traumatizing events, the DB2 format was changed so that combat trauma

exposure was quantified as the number of times an event occurred; in addition, both new events that occurred since the last visit (if applicable) and total number of previous exposures to the events were quantified separately in DB2.

### Comparisons With Deployed Population in Iraqi Combat Theater

TMHED patients were compared on several key demographic characteristics with the population of U.S. troops deployed in the Iraqi combat theater during the same time frame of the TMHED study. This population was identified using a deployment database maintained at NHRC. This database was compiled using records from the Defense Manpower Data Center (DMDC), which maintains deployment-related data for all

Navy-Marine Corps – Theater Medical Registry Form – Psychiatry (V2)											
Name (Last, First MI):		Patient I.D. / SSN:		Paygrade/Category:		MOS:		Unit:			
Date of Birth:		Gender: <input type="checkbox"/> Male <input type="checkbox"/> Female		Treatment: <input type="checkbox"/> Initial <input type="checkbox"/> Follow-Up		Date/Time of Arrival:		Reserve: <input type="checkbox"/> Yes <input type="checkbox"/> No			
Allergies:		MTF Designation:		MTF Location:		Facility Type: <input type="checkbox"/> Base-X <input type="checkbox"/> GP <input type="checkbox"/> CBPS <input type="checkbox"/> Hard Bldg		IA: <input type="checkbox"/> Yes <input type="checkbox"/> No			
Combat and Psychological Trauma Exposure											
N	P	(N = # of New Exposures since last visit)	N	P	(P = # of Prior Total Exposures)	N	P				
<input type="checkbox"/>	<input type="checkbox"/>	Almost Seriously Injured	<input type="checkbox"/>	<input type="checkbox"/>	Knowing someone seriously injured/killed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Seeing enemy killed		
<input type="checkbox"/>	<input type="checkbox"/>	Attacked-Ambushed	<input type="checkbox"/>	<input type="checkbox"/>	Saved life of Marine/Soldier/Sailor/Civilian	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Seeing civilians killed		
<input type="checkbox"/>	<input type="checkbox"/>	Attacked by IED	<input type="checkbox"/>	<input type="checkbox"/>	Seeing Dead bodies or human remains	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Shooting or directing fire at the enemy		
<input type="checkbox"/>	<input type="checkbox"/>	Attacked by Indirect Fire	<input type="checkbox"/>	<input type="checkbox"/>	Seeing death of unit members	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Unable to help ill/injured women/children		
<input type="checkbox"/>	<input type="checkbox"/>	Attacked by RPG	<input type="checkbox"/>	<input type="checkbox"/>	Seeing death of a friend	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Unable to Help or Respond		
<input type="checkbox"/>	<input type="checkbox"/>	Attacked by Small Arms Fire	<input type="checkbox"/>	<input type="checkbox"/>	Seeing serious injury of unit member	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Other:		
<input type="checkbox"/>	<input type="checkbox"/>	Attacked by VBIED	<input type="checkbox"/>	<input type="checkbox"/>	Seeing serious injury of friend	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Unknown <input type="checkbox"/> N/A		
<input type="checkbox"/>	<input type="checkbox"/>	Attacked by Friendly Fire	<input type="checkbox"/>	<input type="checkbox"/>	Seeing Dead or seriously injured Americans	<input type="checkbox"/>	<input type="checkbox"/>	Notes:			
<input type="checkbox"/>	<input type="checkbox"/>	Being Wounded or Injured	<input type="checkbox"/>	<input type="checkbox"/>	Seeing Death/Maiming of Women/Children	<input type="checkbox"/>	<input type="checkbox"/>	N/A			
<input type="checkbox"/>	<input type="checkbox"/>	Being Resp for death of non-combatant	<input type="checkbox"/>	<input type="checkbox"/>	Seeing avoidable casualties or losses	<input type="checkbox"/>	<input type="checkbox"/>	Total No. of New Potential Trauma Exposures N=			
<input type="checkbox"/>	<input type="checkbox"/>	Engaged in Close Combat (<20 yards)	<input type="checkbox"/>	<input type="checkbox"/>	Seeing Accidental Death	<input type="checkbox"/>	<input type="checkbox"/>	Total No. of Past Potential Trauma Exposures P=			
<input type="checkbox"/>	<input type="checkbox"/>	Handling dead bodies or body parts	<input type="checkbox"/>	<input type="checkbox"/>	Seeing burning bodies or death by burning	<input type="checkbox"/>	<input type="checkbox"/>	Total No. of Combat Deployments D=			
<input type="checkbox"/>	<input type="checkbox"/>	Killing enemy combatant	<input type="checkbox"/>	<input type="checkbox"/>	Seeing atrocities	<input type="checkbox"/>	<input type="checkbox"/>				
Current Symptoms Screen											
Traumatic Stress Symptoms			Affective Symptoms			Anxiety Symptoms					
<input type="checkbox"/> Dissociative (3 or more symptoms)			<input type="checkbox"/> Depressive Episode (5 or more symptoms in 2 wks)			<input type="checkbox"/> Panic Attack (4 or more symptoms within 10 min)					
<input type="checkbox"/> Numbing, detachments, lack of emotions			<input type="checkbox"/> Depressive mood <input type="checkbox"/> Anhedonia			<input type="checkbox"/> Palpitation <input type="checkbox"/> Chest Pain					
<input type="checkbox"/> Reduced awareness, being in a daze			<input type="checkbox"/> Weight $\Delta$ <input type="checkbox"/> Inc Appetite <input type="checkbox"/> Dec Appetite			<input type="checkbox"/> Sweating <input type="checkbox"/> Paresthesias					
<input type="checkbox"/> Derealization			<input type="checkbox"/> Insomnia, Hypersomnia or Sleep Disturbance			<input type="checkbox"/> Trembling/shaking <input type="checkbox"/> Chills or hot flashes					
<input type="checkbox"/> Depersonalization			<input type="checkbox"/> Psychomotor agitation or retardation			<input type="checkbox"/> SOB/smothering <input type="checkbox"/> Fear of dying					
<input type="checkbox"/> Dissociative Amnesia			<input type="checkbox"/> Fatigue / loss of energy			<input type="checkbox"/> Nausea/abdo distress <input type="checkbox"/> Dizzy/lightheaded					
<input type="checkbox"/> Re-experiencing (1 or more symptoms)			<input type="checkbox"/> Inappropriate / excessive guilt			<input type="checkbox"/> Choking <input type="checkbox"/> Derealization / depersonalization					
<input type="checkbox"/> Recurrent images, thoughts and feelings			<input type="checkbox"/> Poor concentration / indecisiveness			<input type="checkbox"/> Fear of losing control or going crazy					
<input type="checkbox"/> Nightmares			<input type="checkbox"/> Recurrent thoughts of death			<input type="checkbox"/> Generalized Anxiety or Nervousness					
<input type="checkbox"/> Intense arousal at reminders			<input type="checkbox"/> Thoughts of self-harm <input type="checkbox"/> Suicidal ideation			<input type="checkbox"/> Psychotic Symptoms (1 or more symptoms)					
<input type="checkbox"/> Avoidance of Stimuli			<input type="checkbox"/> Manic Episode (elevated mood + 3 or more below)			<input type="checkbox"/> Hallucinations <input type="checkbox"/> Paranoia					
<input type="checkbox"/> Anxiety or Increased Arousal (1 or more)			<input type="checkbox"/> Distinct period of elevated mood			<input type="checkbox"/> Delusions <input type="checkbox"/> Thought blocking					
<input type="checkbox"/> Sleep delay or interruption			<input type="checkbox"/> During mood elevation 3 or more:			<input type="checkbox"/> Illusions <input type="checkbox"/> Thought insertion					
<input type="checkbox"/> Irritability			<input type="checkbox"/> Inflated self-esteem or grandiosity			<input type="checkbox"/> Ideas of Reference <input type="checkbox"/> Derailment					
<input type="checkbox"/> Poor concentration			<input type="checkbox"/> Decreased need for sleep			<input type="checkbox"/> Operational Stressors					
<input type="checkbox"/> Exaggerated startle			<input type="checkbox"/> More talkative / pressured speech			<input type="checkbox"/> Pre-Existing Condition <input type="checkbox"/> Homefront Issues					
<input type="checkbox"/> Anger			<input type="checkbox"/> Flight of ideas / racing thoughts			<input type="checkbox"/> Peer / Unit Conflict <input type="checkbox"/> Character Factors					
<input type="checkbox"/> Hyper vigilance			<input type="checkbox"/> Distractibility <input type="checkbox"/> Goal-directed activity increase			<input type="checkbox"/> Leadership Conflict <input type="checkbox"/> Legal Issues					
<input type="checkbox"/> Excessive pleasure-seeking activity involvement			<input type="checkbox"/> Excessive pleasure-seeking activity involvement			<input type="checkbox"/> Non-Combat Severe Event					
<input type="checkbox"/> Other:											
Head Injury Screen			Concussion Grade			Recent Head Injury Symptom Checklist:					
Past Hx Head In:			Recent Hx Head In:			Physical		Cognition		Emotional	
<input type="checkbox"/> None			<input type="checkbox"/> None			<input type="checkbox"/> Headache		<input type="checkbox"/> Poor memory		<input type="checkbox"/> Personality change	
<input type="checkbox"/> Hx of Seizures			<input type="checkbox"/> Rec Blast Exposure			<input type="checkbox"/> Dizziness		<input type="checkbox"/> Confusion		<input type="checkbox"/> Mood swings	
<input type="checkbox"/> Hx Alt Conc			<input type="checkbox"/> Proximity to Blast (feet)			<input type="checkbox"/> Blurred vision		<input type="checkbox"/> Concentration $\Delta$ 's		<input type="checkbox"/> Temper outbursts	
<input type="checkbox"/> Hx LOC			<input type="checkbox"/> LOC Brief - seconds			<input type="checkbox"/> Vomiting		<input type="checkbox"/> Trouble reading		<input type="checkbox"/> Loss of interest	
<input type="checkbox"/> # of LOC episodes			<input type="checkbox"/> LOC Prolonged - mm hh dd			<input type="checkbox"/> Fatigue		<input type="checkbox"/> Slowed thinking		<input type="checkbox"/> Withdrawal	
Duration:			Head Injury Notes:			<input type="checkbox"/> Light/noise sensitivity					
Past Psychiatric History:			<input type="checkbox"/> None <input type="checkbox"/> Hospitalization x days <input type="checkbox"/> Outpatient			<input type="checkbox"/> Medications		<input type="checkbox"/> Therapy / Counseling			
Notes:											
N/A (clinical notes not available)											
Substance Abuse Hx			<input type="checkbox"/> None			Substance Use Notes:					
<input type="checkbox"/> EtOH Abuse Hx			<input type="checkbox"/> Supplements Abuse Hx			N/A					
<input type="checkbox"/> Illicit Drug Abuse Hx			<input type="checkbox"/> Tobacco Use Hx								
Developmental and Social History											
Family of Origin			Education			Occupational / Military History			Relationships (Support)		
<input type="checkbox"/> No Problems			<input type="checkbox"/> < High School Diploma or GED			<input type="checkbox"/> No Problems			<input type="checkbox"/> Single <input type="checkbox"/> Co-Habitate		
<input type="checkbox"/> Violence			<input type="checkbox"/> HS Diploma <input type="checkbox"/> GED			<input type="checkbox"/> Fired			<input type="checkbox"/> Separated <input type="checkbox"/> Married		
<input type="checkbox"/> ETOH			<input type="checkbox"/> Some College <input type="checkbox"/> College Graduate			<input type="checkbox"/> NJP x			<input type="checkbox"/> Divorced <input type="checkbox"/> # of Children		
<input type="checkbox"/> Drugs			<input type="checkbox"/> Graduate courses or degree			<input type="checkbox"/> Courts Martial x			<input type="checkbox"/> Other:		
<input type="checkbox"/> Other abuse:			<input type="checkbox"/> Other:			<input type="checkbox"/> Jail					
Dev/Soc Hx Notes:											
N/A											

FIGURE 3. Patient-provider visit documentation form: Version 2 (DB2)—Front page.

U.S. service members. Because the TMHED patient intake period covered a 13-month time frame, the Iraqi combat theater population was defined as all U.S. military troops with Defense Manpower Data Center records indicating deployment in or around Iraq (i.e., Iraq plus Kuwait) at any time between January 1, 2006 and January 31, 2007. Population parameters were then calculated for age, sex, education, rank, and total number of combat deployments both for the overall deployed population as well as separately for each service (Army, Air Force, Marines, and Navy). TMHED cases were compared to the population parameters using  $\chi^2$  statistical procedures for the categorical variables and one-sample  $t$  statistics and confidence intervals for the mean age comparisons.

Because of the large number of statistical comparisons being made, a Bonferroni-adjusted  $p$  value of  $<0.001$  was used to indicate a significant difference between the TMHED cases and the deployed population values.

## RESULTS

Basic characteristics of the TMHED patients are described separately by the form/software used to document patient encounters because the number of cases and specific measures that will be available for further study varied somewhat depending on the software version used to document a visit. TMHED cases also were compared to the entire service population deployed in the Iraqi combat theater during the time



Name (Last, First MI):		Patient I.D. / SSN:	
Past Medical Hx: <input type="checkbox"/> None.		Current Medications List:	
Notes: N/A			
Hx of Present Illness:			
N/A			
Mental Status Exam			
Appearance & Behavior: <input type="checkbox"/> Within Normal Limits Eye Contact / Speech: <input type="checkbox"/> Good eye contact <input type="checkbox"/> Normal speech Motor: <input type="checkbox"/> No psychomotor agitation or retardation Mood: <input type="checkbox"/> Stated mood was " Affect: was Thought Processes: <input type="checkbox"/> WNL - Linear, logical and goal directed. Thought Content: <input type="checkbox"/> WNL: (check if all 3 boxes below are checked) <input type="checkbox"/> No evidence of psychosis <input type="checkbox"/> No suicidal ideation, intent or plan <input type="checkbox"/> No homicidal ideation, intent or plan Cognition: <input type="checkbox"/> Alert & Oriented to person, place, time, situation. <input type="checkbox"/> Concentration Intact. Intelligence estimated to be: Memory: <input type="checkbox"/> Intact for immediate, long and short-term memory. Judgment: <input type="checkbox"/> Intact Insight: <input type="checkbox"/> Intact Impulse Control: <input type="checkbox"/> Intact		MSE Notes: N/A	
Psychiatric Diagnosis		Combat & Operational Stress	
Axis I:		<input type="checkbox"/> None <input type="checkbox"/> Light	
Axis II:		<input type="checkbox"/> Not Applicable <input type="checkbox"/> Moderate	
Axis III:		<input type="checkbox"/> Heavy	
Axis IV:		Notes on Stressors: N/A	
Axis V: GAF (Current) -			
Axis V: GAF (Past Yr) -			
Formulation: N/A			
Treatment Plan			
Goals/Medications/Interventions:		<input type="checkbox"/> Informed Consent Given	
1.		4.	
2.		5.	
3.		6.	
Disposition			
Duty Status: <input type="checkbox"/> Return To Duty/Fit for full duty <input type="checkbox"/> Light Duty x ___ day(s) <input type="checkbox"/> Recommend Medevac out of Theater		Safety: (precautions listed below) <input type="checkbox"/> At low risk for harm to self or others at this time <input type="checkbox"/> At moderate risk for harm to self or others <input type="checkbox"/> At high risk for harm to self or others	
Limitations:		Precautions:	
Provider Signature:		Date/Time:	
Psych Tech Name (Printed or Typed):			
Provider Name (Printed or Typed):			

FIGURE 4. Patient-provider visit documentation form: Version 2 (DB2)—Back page.

frame using demographic information available for both groups.

### Description of TMHED Cases

Table I provides characteristics of TMHED patients separated by the version of the software used to create the database. Because some patients had at least one visit recorded in both software versions (and consequently have both sets of measures unique to each database), these individuals are described separately.

As shown in Table I, just over 10% ( $n = 137$ ) of cases were women. Approximately 75% ( $n = 997$ ) of these service members had a high school education, 16% ( $n = 210$ ) had completed

some college, and almost 9% ( $n = 112$ ) had a college degree or higher. The group was composed of almost 60% Marine Corps, 29% Army, 11% Navy, and 0.2% Air Force personnel. The majority of patients were mid-paygrade enlisted E-4-E-6 (55%), followed by junior paygrade E-1-E-3 (39%), with only 2% senior enlisted E-7-E-9 and 4% officers or warrant officers. About 63% of patients were on their first deployment, 28% were on their second deployment, and about 9% of patients were on their third deployment or more.

There was substantial variation in the number of repeated mental health visits. As indicated above, the number of visits per patient ranged from 1 to 16, with 50% of cases having only 1 documented mental health visit, 21% having 2 visits,

**TABLE I.** Descriptive Characteristics of Personnel with Mental Health Encounters in Theater: Frequencies by the Database Used to Document Patients' Encounters

	DB1, <i>n</i>	DB2, <i>n</i>	Both DB1 and DB2, <i>n</i>	Total, <i>n</i> (% of Total) <sup>a</sup>
All Patients	558	705	73	1336 (100)
Sex				
Men	485	652	62	1199 (90)
Women	73	53	11	137 (10)
Education				
High School				
Diploma <sup>b</sup>	427	505	45	997 (75)
Some College	83	114	13	210 (16)
College Graduate or Higher	32	66	14	112 (9)
Branch of Service				
Army	173	192	24	389 (29)
Air Force	0	3	0	3 (<1)
Marine Corps	330	429	37	796 (60)
Navy	55	81	12	148 (11)
Rank				
Enlisted: E-1-E-3	204	290	20	514 (39)
Enlisted: E-4-E-6	329	363	45	737 (55)
Enlisted: E-7-E-9	9	19	2	30 (2)
Officers, Including Warrant	16	6	0	55 (4)
Total Number Combat Deployments				
1	347	448	41	836 (63)
2	153	196	21	370 (28)
3	48	51	11	110 (8)
4+	3	3	0	6 (0.5)
Visits Per Person (Range of Visits Per Person)	1-16	1-12	2-16	1-16
1	280	384	0	664 (50)
2	115	154	9	278 (21)
3	49	73	13	135 (10)
4	38	51	9	98 (7)
5+	76	43	42	161 (12)

<sup>a</sup>Overall *n* < 1,336 for some variables because of missing data. <sup>b</sup>High school diploma or GED.

10% having 3 visits, 7% with 4 visits, and 12% having 5-16 visits. It should be noted, however, that some patients might have had mental health encounters that were not documented in the TMHED database because they occurred before or after the TMHED data collection period. Each recorded visit was checked as either an initial or follow-up visit; and for 248 of the 1,336 patients, the first recorded visit in TMHED was checked as a follow-up visit, suggesting these patients had at least one previous mental health encounter. It was not possible to determine if a prior mental health visit occurred in theater, thereby making the first TMHED encounter an actual follow-up visit in theater, or whether a prior encounter may have referred to a predeployment mental health visit.

### Comparison of TMHED Cases With the Iraqi Combat Theater-Deployed Population

Patients seen by mental health providers deployed with the 1st Marine Division were stationed primarily in and around Al

Anbar province. Thus, due in part to geographic limitations, TMHED patients would not necessarily be expected to be representative of the overall population of troops deployed in the Iraqi war zone, which covered a much broader region. More importantly, individuals needing mental health care in-theater might be expected to differ on various factors from those not referred for care. Thus, a first step in describing the TMHED cases and identifying potential risk factors for mental health problems in-theater was to compare them to the full population of troops deployed during the same period on key demographic characteristics that were available for the population of service personnel.

Table II provides overall descriptive information, as well as stratified by service branch, on five key demographic characteristics: men and women, education level, rank, total number of combat deployments, and mean age. Statistical tests were computed to compare all TMHED cases with the overall deployed population on these descriptive characteristics, as well as computed separately for each branch of service. The Air Force cases were an exception because there were too few TMHED cases (*n* = 3) in this branch to conduct formal statistical analyses.

Statistically significant (*p* < 0.001) differences were found in 5 of 6 comparisons of the total TMHED group with the total deployed population (see the last two columns in Table II). The percentages of TMHED cases from each branch of service were significantly different from the percentages in the overall deployed population. A much higher percentage of TMHED cases were Marines (59.6% vs. 16.0% in the population), a higher percentage were Navy (11.1% vs. 5.3% in the population), but a lower percentage were Army (29.1% vs. 67.1% in the population), and only 3 TMHED cases were Air Force (0.2% vs. 11.7% in the deployed population). For education, the percentage of those who completed high school or a general equivalency diploma (GED) was almost identical in the deployed and TMHED populations (~75%); however, a higher percentage of TMHED cases had some college education (16.2% vs. 4.8% in population), whereas a higher percentage of the deployed population had a college degree or higher (TMHED 8.6% vs. 19.3% in population). The rank comparison showed that TMHED cases were more likely to be junior (E-1-E-3) enlisted (38.5% of cases vs. 24.1% of the deployed population), with only 4.1% of TMHED cases but 13.6% of the deployed population being officers. Regarding total number of combat deployments, almost identical percentages of TMHED and the deployed population were in their first and second deployment; however, a slightly higher percentage of TMHED cases were on their third deployment (8.3% vs. 6.3% of the deployed population), and a slightly lower percentage of TMHED cases were on their fourth or more combat deployment (0.5% vs. 2.0% of the population), which reflected differences primarily among Navy personnel (see below). Finally, the age of TMHED cases was about 2 years younger on average (25.9 vs. 28.0 years old) than the deployed population. There was no significant difference



**TABLE II.** Descriptive Comparisons of TMHED Cases with Deployed Iraqi Combat Theater Population, January 2006–January 2007<sup>a</sup>

	Army		Air Force		Marine Corps		Navy		TMHED Cases <sup>b</sup>	Deployed Population
	TMHED %	Deployment %	TMHED %	Deployment %	TMHED %	Deployment %	TMHED %	Deployment %	TMHED %	Deployment %
Troops	$p < 0.001$		— <sup>b</sup>		$p < 0.001$		$p < 0.001$		$p < 0.001$	
Percent of Cases (TMHED, <i>n</i> )	29.1 (389)	67.1	0.2 (3)	11.7	59.6 (796)	16.0	11.1 (148)	5.3	100 (1336)	100
Sex	$p < 0.001$		—		$p < 0.001$		ns		ns	
Men	85.1	90.3	100.0	85.8	92.1	96.4	89.2	89.3	89.7	90.7
Women	14.9	9.7	0.0	14.2	7.9	3.6	10.8	10.7	10.3	9.3
Education	$p < 0.001$		—		$p < 0.001$		$p < 0.001$		$p < 0.001$	
High School	75.4	75.2	66.7	64.5	79.1	87.5	53.5	76.3	75.2	75.9
Diploma/GED										
Some College	14.3	5.2	33.3	7.8	14.4	1.0	30.3	3.7	16.2	4.8
College Graduate, Plus	10.3	19.6	0.0	27.7	6.5	11.5	16.2	20.0	8.6	19.3
Rank	$p < 0.001$		—		$p < 0.001$		$p < 0.001$		$p < 0.001$	
Enlisted: E-1–E-3	16.8	21.0	66.7	15.1	51.5	46.5	25.0	15.5	38.5	24.1
Enlisted: E-4–E-6	79.1	57.1	33.3	59.5	41.5	38.5	66.2	58.5	55.2	54.5
Enlisted: E-7–E-9	1.3	8.0	0.0	10.2	2.6	5.0	2.7	8.7	2.2	7.8
Officers Including Warrant	2.8	13.9	0.0	15.2	4.4	10.0	6.1	17.3	4.1	13.6
Total Number of Combat Deployments	ns		—		ns		$p < 0.001$		$p < 0.001$	
1	65.5	61.9	100.0	69.4	60.8	59.8	69.6	80.5	63.2	63.5
2	28.8	29.4	0.0	21.9	28.8	32.4	22.3	14.3	28.0	28.2
3	4.9	6.6	0.0	5.3	10.0	7.2	8.1	2.6	8.3	6.3
4+	0.8	2.1	0.0	3.4	0.4	0.6	0.0	2.6	0.5	2.0
Age	ns		—		ns		$p < 0.001$		$p < 0.001$	
Mean (SD)	28.4 (7.4)	28.3	23.0 (2.0)	29.5	24.1 (4.7)	24.4	28.8 (7.0)	31.6	25.9 (6.3)	28.0

<sup>a</sup>Overall TMHED *n* = 1,336, but was less for some variables because of missing data. Because of the large number of comparisons, a Bonferroni adjusted *p* value of <0.001 was used to determine significant differences between TMHED cases and population parameters. <sup>b</sup>No statistical comparisons were made for Air Force because of only 3 TMHED cases. ns, not significant.

between all TMHED cases and the total deployed population in percentages of men and women.

When examining descriptive characteristics separately by service (except for the Air Force, which had too few cases to examine), most comparisons indicated statistically significant differences between the branch-specific TMHED cases and the deployed population for that branch. For example, among Army personnel, a higher percentage of TMHED cases were women (14.9% vs. 9.7% in the deployed Army population). TMHED Army cases were more likely to have attended some college (14.3% vs. 5.2%, respectively), but less likely to have college degrees (10.3% vs. 19.6% in the deployed population); and TMHED cases were less likely to be senior enlisted or officers (4.1% of cases vs. 21.9% in the deployed Army population). However, there were no significant differences in number of combat deployments or mean age (28 years) in Army comparisons.

Similar patterns were found for Marines, with TMHED cases having a higher percentage of women than the deployed Marine population (7.9% vs. 3.6%, respectively); more Marine TMHED cases having attended some college (14.4% vs. 1.0%, respectively) but fewer cases having college degrees than in the deployed population (6.5% vs. 11.5%); and fewer senior enlisted and officers among Marine TMHED cases than in the deployed Marine Corps population (7.0% vs. 15.0%). Also, there were no significant differences in number of combat deployments or mean age (24 years) for Marines.

Unlike the Army and Marine comparisons, there was no significant sex distribution difference between Navy TMHED cases and the deployed Navy population (just under 11% women in both groups). TMHED Navy cases were less likely to have only a high school education (53.5% vs. 76.3% of the deployed Navy population), but were more likely to have some college education (30.3% vs. 3.7%, respectively) and only slightly less likely to have a college degree (16.2% vs. 20.0% in the deployed Navy population). There were also significantly more junior- and mid-level enlisted personnel among Navy TMHED cases than in the deployed Navy population (91.2% vs. 74.0%, respectively). Navy TMHED cases were less likely than the deployed Navy population to be on their first combat deployment (69.6% vs. 80.5%, respectively) but more likely to be on their second or third combat deployment (30.4% vs. 16.9% in the population); also, Navy TMHED cases were almost 3 years younger on average (28.8 years of age vs. 31.6 years in the deployed Navy population).

## DISCUSSION

The primary aim of this report was to provide a comprehensive description of the TMHED study design and methods, including the patient population, study procedures, and types of measures documented during clinical psychiatric encounters with OSCAR providers in the Iraqi combat theater. The 1,336 TMHED cases had a total of 3,180 patient visits

with 1–16 visits per person (half of cases having 2 or more visits). Just over 10% of cases were women, approximately 75% had a high school education, and the majority of cases were Marines (60%). Most patients (55%) were mid-paygrade enlisted E-4–E-6, and just under two-thirds (63%) were on their first deployment. The average age of the TMHED cases was almost 26 years.

A first step in better understanding and treating those needing psychiatric care during combat deployment is to identify risk factors associated with mental health problems. Thus, a secondary aim of this paper was to compare TMHED cases with the full U.S. military population deployed in and around the Iraqi combat theater during the study's time frame using available demographic information. This comparison provided a first look at similarities and differences in potential demographic risk factors that should be further explored, especially as they might relate both to in-theater treatment as well as postdeployment outcomes.

The largest difference between the TMHED cases and the combat-deployed population was in the distribution across the four military branches. A substantially higher percentage of TMHED cases were Marines and Navy personnel and a lower percentage were Army and Air Force personnel compared to the total population deployed to the Iraqi combat theater. However, the large and predominant percentage of Marine TMHED cases was not surprising considering that the OSCAR providers were deployed with the 1st Marine Division and were stationed primarily at bases within one Iraqi province (Al Anbar), which was also where most Marines were stationed during the study period.

Results for other demographic comparisons varied somewhat by branch of service, however, TMHED cases included fewer individuals with a college degree, fewer senior enlisted personnel and officers, slightly more cases in their third combat deployment, and younger individuals than those found in the overall deployed population. These differences point to potential risk factors that should be further explored, especially to determine the extent to which these might represent independent risk factors versus constellations of correlated characteristics. TMHED cases being younger, less likely to have a college degree, and less likely to be senior enlisted personnel or officers might reflect covarying risks related to maturation. Alternatively, these might represent independent risk factors for mental health problems in theater. For example, the "resilience" that might be developed in the process of earning a college degree, or the personal characteristics required to meet selection criteria to become senior enlisted or officers might be independent "protective factors" against mental health problems in stressful situations. A final notable finding was that a slightly higher than expected percentage of TMHED cases were in their third combat deployment compared to the overall deployed population. A third combat deployment might represent a "mental fatigue threshold" for some individuals, especially those who are younger, junior enlisted, and somewhat less educated. This finding certainly warrants follow-up research.

In summary, a unique strength of the TMHED study is the in-depth documentation of psychiatric encounters for all cases seen by mental health providers deployed with the 1st Marine Division in the Iraqi combat zone over a yearlong period. In-theater clinical encounter data provide a unique opportunity to examine the characteristics of early psychiatric intervention and address fundamental questions regarding acute mental health disorders in a combat zone, as well as prospectively study postdeployment outcomes. Unlike retrospective recalls of combat trauma, often assessed months or years after exposure, TMHED data can be used to study the unique characteristics and effects of specific acute combat exposures as potentially traumatizing events, and assess whether early intervention relates to long-term postdeployment outcomes.

Although beyond the scope of the current report, subsequent articles will address broader topics that include describing patient-reported combat and psychological trauma exposure, stress and affective symptoms, and provider-documented mental status, stress diagnoses, treatment plans, and case dispositions. Relationships among the TMHED measures documented in theater, as well as prospective prediction of postdeployment use of medical services and career and performance outcomes, will also be explored. Of particular interest is whether TMHED data predict postdeployment use of both inpatient and outpatient medical services and career outcomes, such as early attrition, promotions and demotions, highest paygrade achieved, reenlistment, and type of discharge from the service. Findings from TMHED studies could provide useful information relevant to recommendations that inform military policymakers responsible for service members' well being. A better understanding of early in-theater psychiatric intervention that helps service members cope in stressful combat situations could have an impact on improving the continuum of care and long-term quality of life of service members exposed to combat stress.

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## REPORT DOCUMENTATION PAGE

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